

- WASHBURN, S. L.; DEVORE, I. (1961): The social life of Baboons. *Scientific American*, Repr. Nr. 641, June 1961, 2—11.
- TOKUDA, K.; JENSEN, G. D. (1968): The leader's role in controlling aggressive behaviour in a monkey group. *Primates* 9, 319—322.

*Author's address:* Dr. O. ANNE E. RASA, Fachbereich Biologie (Zoologie) der Universität Marburg, Lahnberge, D-3550 Marburg/Lahn

## "Teat order" in Hyrax (*Procavia johnstoni* and *Heterohyrax brucei*)

By H. N. HOECK

*Max-Planck-Institut für Verhaltensphysiologie, Seewiesen und Serengeti Research Institute, Tanzania<sup>1</sup>*

*Eingang des Ms. 16. 3. 1976*

Teat constancy is known in pigs (NACHTSHEIM 1925; DONALD 1937; HÖPLER 1943; BURGHARDT 1957; MCBRIDE 1963), cats (EWER 1960; ROSENBLATT 1972) and rats (BONATH 1972), all altricial mammals. Hyraxes are precocial, bearing fully developed young after a gestation period of approximately 7½ month (ROCHE 1962; MENDELSSOHN 1965; SALE 1965 a, b). The Rock hyrax *P. johnstoni* and the Bush hyrax *H. brucei* were observed in the Serengeti National Park, Tanzania, for 30 month. Most animals were marked. Hyraxes are the most characteristic resident mammals of the rock outcrops (kopjes), living in family groups consisting of an adult ♂, several adult ♀♀ and juveniles of both sexes. ♀♀ within a group have synchronized birth (1—4 young observed) and are genetically related (HOECK, in prep.).



*Fig. 1.* two infants (about 3 months old) of *P. johnstoni* suckling from the pectoral teats. The fur in front of the dam's hind legs is disordered where the infants suck from the inguinal teats

<sup>1</sup> This paper is S. R. I. Contribution Number 210.

Females have one pair of pectoral and two pairs of inguinal teats; the young suck from a position anterior to the dam's legs (Fig. 1) and when changing sides they always do so by going round her head.

In both species suckling spells last about 5 min, and occur at intervals of one to two hours. Frequency of suckling gradually decreases with age. Infants were observed being suckled up to 6 month old (HOECK, in prep.).

Litters with one young (Fig. 2):

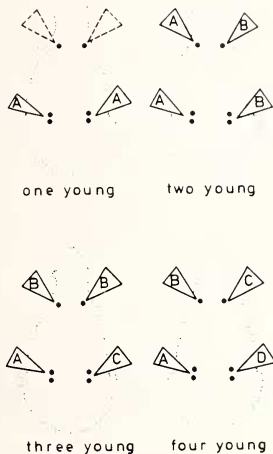


Fig. 2. Suckling patterns in Hyrax for litters of 1-4 young (see text)

*P. johnstoni*: In 95 observed suckling spells with one tame but free living ♀ the infant fed exclusively from the two pairs of inguinal teats. In 13 further spells, all in the first two days of life, brief (a few seconds) suckling from both pectoral teats occurred. Exclusive inguinal teat feeding was also seen in three spells involving unmarked ♀♀ each with one infant.

*H. brucei*: In 13 marked ♀♀ and their marked young exclusive inguinal teat feeding was observed in 37 suckling spells, and brief additional suckling from the pectoral teats in 23 spells.

Litters with two young (Fig. 2):

*P. johnstoni*: 312 suckling spells were observed with 3 marked ♀♀ (pos. 287, 17 and 2) and one each on 6 unmarked ♀♀. In 289 spells the young always kept strictly to the same side, each using one pectoral and two lateral inguinal teats. In 13 spells an infant "poached" on the pectoral teat monopolized by the other, inducing 8 aggressive responses. In 9 spells where only one infant sucked, restriction to those teats from which it habitually fed was noted only once. Once an unmarked ♀'s infant, besides feeding from two lateral inguinal teats, sucked from both pectorals, defending them against its sibling.

*H. brucei*: In 51 suckling spells involving 10 ♀♀ and their young (marked) and 7 single observations on unmarked animals, the two young monopolized one side each, invariably the same. In 17 spells one infant "poached" on the opposite pectoral teat, inducing aggressive sibling response on 4 occasions. In one spell a lone infant sucked indiscriminately on both sides.

Litters with three or four young (Fig. 2):

*P. johnstoni*: In 2 feedings involving unmarked animals the three young adhered to the following pattern: One fed from the inguinal teats on the right, one from those

on the left, while the third claimed the pectoral teats. Once when an infant relinquished the inguinal teats the sibling at the pectoral position took over these.

26 suckling spells were observed involving a ♀ with four marked infants. In 21 spells teat allocation was constant: each of two young monopolized the two lateral inguinal teats, the others were restricted to a single pectoral teat each. When (in 3 spells) only one "pectoral" infant was present, it sucked from both pectorals; once when the right "inguinal" was absent the right "pectoral" infant fed at this position (the three young pattern). Once when "inguinal" young were absent the two-young-pattern was established by the remaining ("pectoral") young.

As yet, the three- and four-young-patterns have not been observed in *H. brucei*.

#### Competition of older offspring:

Soon after the tame *P. johnstoni* ♀ bore one male infant, her one-year-old ♀ joined them, making a first sucking attempt the second time the newborn was suckled. She was suckled four times before the newborn started defending the teats, and from the second day the dam threatened or bit whenever she attempted to feed. In total 19 sucking attempts were observed, of which 12 were on the side she had monopolized when younger. Sucking attempts of yearlings were also seen in *H. brucei*. Similar reports exist for *P. capensis* (MELTZER 1967).

#### Additional observations:

In 5 observations (3 *P. johnstoni*, 2 *H. brucei*) an infant attempting to feed from a ♀ not its mother was immediately repulsed. Twice, two infant *P. johnstoni* attempted sucking on a ♂, each "sucked" briefly from the side to which it was habituated on the mother.

An *H. brucei* orphan attached itself to a ♀ with one infant. In 6 observed sucking attempts it was interrupted and repulsed by the ♀, but it prevailed in two full feeds at the left inguinal teats. No aggressive response was observed from the other infant, which then sucked from both pectoral and the right inguinal teats.

The ontogeny of the teat order is not fully known. For one observed *P. johnstoni* dam with twins, the "teat order" established the second day after birth remained unchanged as long as the infants were suckled.

### Summary

Young hyrax (*Procavia johnstoni*, *Heterohyrax brucei*) invariably suck from the same teats, such apportionment reducing competition. Litter number determines the number of teats per infant. If a sibling is absent "teat order" temporarily assumes the pattern for the number of young then actually feeding. Furthermore, it seems that dams recognize their own young. This observation does not agree with a report that suckling in Hyrax is indiscriminate (SALE 1965 b), but it is in agreement with observations on *P. capensis* (MELTZER 1967).

### Zusammenfassung

#### Zitzenkonstanz bei Klipp- und Buschschliefer

Junge Klipp- (*Procavia johnstoni*) und Buschschliefer (*Heterohyrax brucei*) zeigen Zitzenkonstanz, wobei die Konkurrenz beim Trinken verringert wird. Die Zahl der Zitzen pro Junges wird durch die Wurfgröße bestimmt. Ist ein Junges abwesend, ändert sich vorübergehend das Muster der „Zitzenordnung“ für die Anzahl der augenblicklich trinkenden Jungen. Vermutlich können Mütter ihre eigenen Jungen von anderen unterscheiden. Diese Beobachtungen stimmen nicht mit denen von SALE (1965 b) überein, der schreibt, daß Schliefer wahllos an den Zitzen saugen würden, bestätigen aber die Untersuchungen von MELTZER (1967) an *P. capensis*.

## Acknowledgements

I would like to express my gratitude to the Director of the Serengeti Research Institute, Dr. T. MCHARO, for allowing me to work in the Institute; to Prof. J. JACOBS and Prof. Dr. W. WICKLER for advice and useful criticism. My thanks are also due to Mr. G. NYAOLE GAGAH for contributing many observations and to Miss B. KNAUER for drawing the graph.

## Literature

- BONATH, K. (1972): Saugordnung und individuelle Differenzierung von Rattensäuglingen (*Rattus norvegicus*) am Gesäuge ihrer Mutter. Z. Tierpsychol. 31, 8—14.
- BURGHARDT, M. (1957): Die Milchleistung der Sau unter besonderer Berücksichtigung der Leistung der Einzelzitze, Agr. Diss. München.
- DONALD, H. P. (1937): Suckling and suckling preference in pigs. Imp. J. exp. Agric. 5, 361 to 368.
- EWER, R. F. (1960): Suckling behaviour in kittens. Behaviour 15, 146—162.
- HÖPLER, E. v. (1943): Trinken Ferkel tatsächlich immer am gleichen Strich? Z. f. Schweinezucht 50, 147—148.
- MCBRIDE, G. (1963): The "teat order" and communication in young pigs. Anim. Behav. 11, 53—56.
- MELTZER, A. (1967): The Rock Hyrax. Unpubl. M. Sc. Thesis. Tel-Aviv University.
- MENDELSSOHN, H. (1965): Breeding the Syrian Hyrax. Int. Zoo. Yb 5, 116—125.
- NACHTSHEIM, H. (1925): Zitzenzahl und Ferkelzahl. Deutsche Landw. Tierz. 21, 10.
- ROCHE, J. (1962): Nouvelles donnees sur la reproduction des Hyracoides. Mammalia 26, 517—529.
- ROSENBLATT, J. S. (1972): Learning in newborn kittens. Scient. Amer. 227, 18—25.
- SALE, J. B. (1965a): Gestation period and neonatal weight of Hyrax. Nature 205, 1240—1241.
- (1965b): Observations on parturition and related phenomena in the Hyrax. Acta Tropica 22, 37—54.

*Author's addresses:* Dr. H. N. HOECK, Max-Planck-Institut für Verhaltensphysiologie, D—8131 Seewiesen and Serengeti Research Institute, P. O. Seronera, via Arusha, Tanzania

*Dendrohyrax validus* True, 1890 in Kenia

VON U. SEIBT, H. N. HOECK und W. WICKLER

Max-Planck-Institut für Verhaltensphysiologie, Seewiesen

Eingang des Ms. 15. 4. 1976

Der Waldschliefer *D. validus* („Eastern tree Dassie“) steht nach HAHN (1959) systematisch zwischen den Arten *D. dorsalis* und *D. arboreus*, dem bekannten Baumschliefer; nach demselben Autor steht *D. validus* der Ursprungsform für die Gattung *Heterohyrax* nahe. *D. validus* ist zwar ein Baumtier sowohl des tropischen Mischwaldes als auch des ostafrikanischen Berg- und Galeriewaldes (RAHM 1964), bewohnt aber, wie auch *D. arboreus*, einige Gesteinszonen, wo der Wald fehlt oder vernichtet